DOE Environmental Management International Projects Highlights

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BACKGROUND AND OBJECTIVES

Berkeley Lab is involved in eight projects with Russia, Ukraine, and Argentina. The projects with Russia are conducted according to a "Memorandum of Cooperation in the Areas of Environmental Restoration and Waste Management" between DOE and the Ministry of Atomic Energy for the Russian Federation. The projects with Argentina are being conducted according to the "Implementing Arrangement" between DOE and the National Atomic Energy Commission of the Argentine Republic. The collaboration with Ukraine is provided in accordance with the agreement between the U.S. and Ukraine governments concerning the International Radioecology Laboratory of the International Chernobyl Center.

The overall goal of these projects is to assess and improve the capability of the DOE's fate and transport models in predicting future environmental and human impacts of radioactive contaminant releases. The international sites chosen will benefit from application of the latest U.S. models, while DOE will benefit from access to long-term and detailed monitoring data sets of contaminant transport in a variety of contaminant, climatic, and geological settings.

APPROACH AND ACCOMPLISHMENTS

The projects with Russia include predictions of transport of radionuclides (^{90}Sr, ^{137}Cs, ^{238}U, and ^{239}Pu) and nitrates in the groundwater at the Mayak and the Lake Karachay sites (which are among the most radioactively contaminated sites in the world). Models for deep well injection of liquid radiation waste have been developed for the Tomsk site. In addition, conceptual and numerical models have been developed for vadose zone flow and transport at two field sites (Novo-Voronezh and Tomsk), as well as comparison of modeling and experimental data for calibrating the numerical models.

The International Radioecology Laboratory in Ukraine provides services to researchers from Texas Tech University and the Savannah River Ecology Laboratory to conduct their research in the Chernobyl Exclusion Zone. A Special Issue of the International Journal of Environmental Sciences and Pollution Research (ESPR) devoted to problems arising from the Chernobyl Nuclear Power Plant accident of 1986 is being edited and prepared for publication, including manuscripts submitted from Ukraine, Canada, U.S., and Russia.

The projects with Argentina include: (1) numerical modeling and characterization of groundwater flow and contaminant transport at the Ezeiza nuclear waste disposal site, with recommendations for appropriate monitoring technologies; and (2) investigations of the physics of liquid flow and contaminant transport to develop improved conceptual and mathematical modeling for unsaturated fractured-porous media.

SIGNIFICANCE OF FINDINGS

These projects will allow DOE researchers, engineers, and managers to use international scientific resources to test and build confidence in DOE's fate and contaminant transport models and remediation technologies, and to reduce the costs and increase the predictability of remediation technologies during long-term stewardship of DOE sites.

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